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CABINET MOUNTAINS GRIZZLY BEAR STUDY ANNUAL REPORT JUNE - DECEMBER 1983

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ABSTRACT

The Cabinet Mountains grizzly bear study began in April of 1983 through funding provided by U.S. Borax Corporation. Two and one-half months of trapping effort produced 40 black bears and one grizzly. Radio collars were placed on five black bears and the grizzly. The grizzly was a 28.5 year-old female. Though lactating, no young were observed with the female. Bears were radio tracked through denning. Physical and vegetation attributes of radio locations were summarized and compared.

INTRODUCTION

In the 48 adjacent states, the grizzly bear (Ursus arctos horribilis) is currently listed as a "threatened species" under provisions of the 1973 Endangered Species Act. Six ecosystems have been designated as containing self-perpetuating or remnant grizzly populations (USFWS 1981). Of these, the population in the Cabinet-Yaak Ecosystem (CYE) has recently been subjected to increasing mineral exploration activities, timber harvest, and human habitation. In response to the potential impacts from these activities, the Montana Department of Fish, Wildlife, and Parks (MDFWP) initiated the Cabinet Mountains grizzly study. This study began in April of 1983 through funding provided by U.S. Borax Corporation. Funding was also obtained from the U.S. Fish and Wildlife Service, but will not be used until the 1984 trapping season.

Existing information on grizzly bears in the Cabinets consists largely of surveys of habitat and examination of reports of sightings and sign (Moore and Gilbert 1977, Erickson 1976, 1978). A large portion of the Cabinets has been grizzly bear habitat component mapped through use of a procedure described by Madel (1982). During 1979-1980 an effort was made to capture and radio-collar a grizzly in the Cabinets, however, this attempt was unsuccessful (Thier 1981). Present U.S. Forest Service Cabinet Mountains grizzly habitat management is based on the Cumulative Effects Analysis Process (Christensen 1982).

The CYE is located in northwest Montana and northern Idaho. There is concern that human developments along U.S. Highway 2 are fragmenting the CYE and creating an "island" population in the Cabinets. The Yaak (north half) borders Canadian grizzly populations to the north. The Cabinets (south half) are currently undergoing increased resource demands through mineral exploration, timber management, and recreation. The subdivision of the CYE makes the Cabinet grizzly population more vulnerable to these impacts due to low population size. The Cabinets were therefore selected as the core study area.

Most of the CYE is on public land administered by the Kootenai, Lolo, and Panhandle National Forests. Plum Creek Timber Company and St. Regis are the main corporations holding significant amounts of land in the area. The cabinet mountain range extends along north-south trending faults between the Clark Fork River on the south and the Kootenai River 35 miles to the north. (Fig. 1). The main and west Cabinets are separated by the Bull River which flows south to the Clark Fork. The study area is further described by Joslin (1981) and the mineral resources by the U.S. Geological Survey (1981).

OBJECTIVES

1. Review and analyze all previously collected data on grizzly bear distribution, movements, habitat-use, and preference in the Cabinet Mountains.

2. Initiate grizzly bear studies through trapping and radio tracking instrumented individuals.

3. Conduct intensive field studies to determine seasonal distribution movement corridors, habitat-use and preference, food habits, and behavioral patterns of radio-collared grizzlies. Habitat cover will be analyzed to determine characteristics of plant communities used by grizzly bears. Critical bear use areas and habitats will be identified within the study area.

4. Determine the impacts of mineral exploration and development, timber harvest, and other human activities on bear behavioral patterns, distribution, habitat-use, productivity, and biological status. This information will be used to make recommendations and guidelines to protect and maintain grizzly bear populations and important habitat.

5. Conduct black bear studies incidental to grizzly investigations to determine interspecific interactions and determine the impacts of these human activities on black bears. Black bear productivity, population, habitat-use, distribution, movement, and behavior data will be gathered and analyzed.

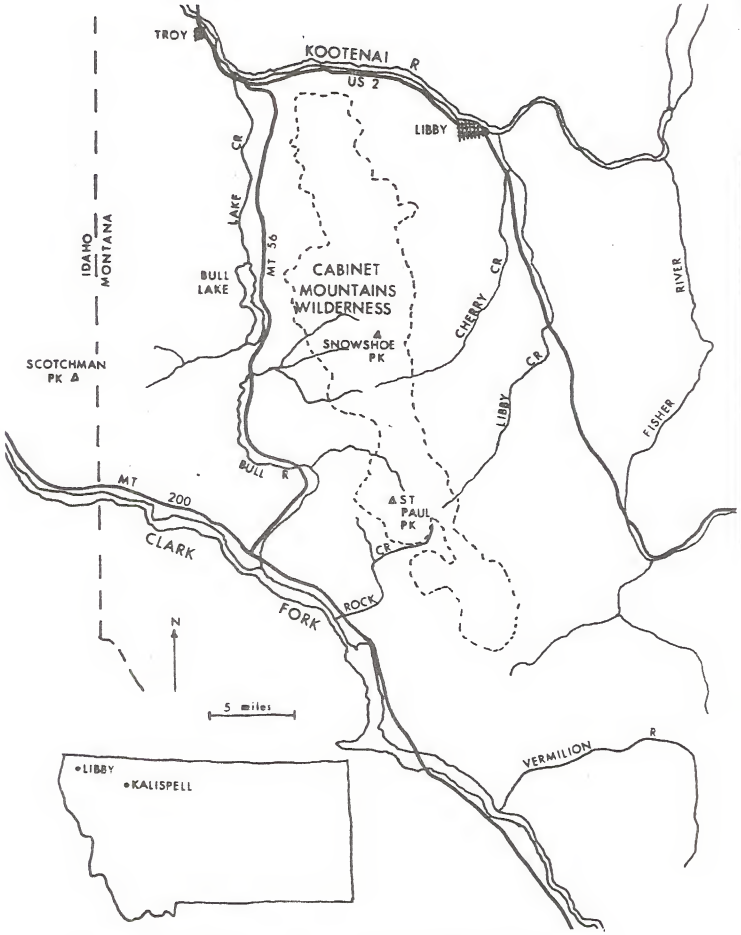


Figure 1. Map of study area in the Cabinet Mountains, Montana

PROCEDURES

Bears were trapped with foot snares in cubbies or trail sets baited with road-killed deer and miscellaneous meat scraps. Capture methods used were described by Aune and Stivers (1983). Warning signs were posted to minimize bear/human encounters.

Captured bears were immobilized with ketamine hydrochloride (Ketaset or Vetalar) and xylazine (Rompun). Phencyclidine hydrochloride (Sernylan) and promazine hydrochloride (Sparine) were used on large and unusually aggressive individuals.

Plastic ear tags (Rototags) were used to mark captured bears. One numbered tag was placed in each ear. Although each ear held a different number, the tags were usually sequential. Physical measurements of the bear were also taken. Scale weights were taken on as many bears as possible. The first premolar was extracted and used to determine the age of the individual by counting cementum annuli (Stoneberg and Jonkel 1966).

Selected black bears were fitted with radio collars in the 150.000 MHz range (Telonics). The only grizzly captured was fitted with a 164.000 MHz range transmitter. Radio instrumented bears were monitored from air and ground. Aircraft used for relocations included a Cessna 180, 182, and Piper Supercub. All planes were equipped with a twin antenna system and a switchbox. Locations were plotted on 1:24,000 USGS topographic maps by UTM coordinates.

Several radio locations were visited to determine the activity of the bear at the site. If activity could be determined or some sign located, a circular vegetation plot ($375m^2$) was delineated. Vegetation canopy coverage and structure were recorded. Plant nomenclature followed Hitchcock and Cronquist (1973).

Scats were collected, tagged, and frozen for food habit analysis. Only scats larger than 6.25 cm (2.5 in) diameter and greater than one liter in volume were considered to be grizzly unless other sign indicated the origin to be grizzly.

Real time motion sensing collars aided in determining activity patterns through continuous monitoring for 24 hour periods. Bears were monitored every one-quarter to one-half hour to record signal strength, constancy, mode, and location. Motion sensitive collars were used only on grizzlies.

Bear dens were located by chance and reports from individuals. Physical and vegetation data were recorded about the site as well as the condition and type of den.

RESULTS

GRIZZLY BEAR STUDY

Trapping began in early May and ran through mid-July. Trapping efforts were concentrated on the east side of the main Cabinet Range from Deep Creek south to the West Fisher. Approximately two weeks were spent trapping the west side of the main Cabinets in the Bull River drainage. Forty black bears and one grizzly were captured. Five black bears and the grizzly were fitted with radio-collars and tracked till denning.

A female grizzly was captured on June 29 in the Bear Creek drainage. Physical measurements and a scale weight of 86.4 kg (190 lbs.) were obtained (Table 1.). The bear appeared in fair physical condition considering the date of capture. There were no signs of any recent suckling, but the animal was lactating. A count of cementum annuli from the extracted tooth indicated an age of 28.5 years. Visual observations on October 6 and 30, and other evidence from summer locations did not indicate that she was accompanied by cubs or yearlings. One other grizzly did visit and trigger a snare, but capture was unsuccessful. Hair and track measurements were collected.

Twenty-eight specific radio locations were obtained from capture till denning. Nine were from summer and nineteen were fall locations. Seasons are defined as summer (July 1 - August 15) and fall (August 16 - Denning). Home range size has not been determined at the writing of this report, but locations are plotted in Fig. 2. The resultant home range would be partial at best due to the late date of capture and the lack of spring locations. The total home range from northerly to southerly extreme covers approximately 40 airline miles.

Summer radio locations were concentrated in Bear and Cherry creek drainages. Heavy use of mixed shrubfield snowchutes, timbered shrubfields, and drainage forbfield habitat components was observed. Mean elevation of summer radio locations was 1558 m (5113 ft., SD=226m, N=9).

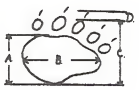
Fall radio locations showed little affinity for a single geographic area as did summer locations. During mid-August grizzly 678 moved about 25 miles southeast to the Vermilion River drainage. She remained in the vicinity of a large clearcut feeding on huckleberries for about two and one-half weeks. In early September grizzly 678 returned to the vicinity of Bear, Cherry, and Deep creek drainages. The remainder of the fall was spent in the northerly portion of the Cabinets. Major habitat components used during fall were: timbered shrubfields, mixed shrubfield cutting units, and mixed shrubfield snowchutes. Mean elevation of fall radio locations was 1580 m (5183 ft., SD=234 m, N=19).

Time of denning was difficult to establish because inclement weather prevented aerial locations and ground attempts to locate the bear were unsuccessful. Denning did occur sometime during the first three weeks of November. Due to the location of the den, the weather conditions in early November, and the fact that the radio signal changed modes several times during the flight of November 22, it was the judgment of the author that grizzly 678 probably denned between the 10th and 20th of the month. The den was located on a beargrass sidehill park at 1890 m (6200 ft) in the upper portion of the Bull River.

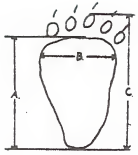
Table 1. Physical measurement of grizzly 678 captured in the Cabinet Mountains, 1983.

Date	6/29/83
Age and Sex[1]	28.5 Female
Weight	86.4 kg (190 lbs.)
Color	Medium brown silvertip, dark leggings, silver face and head
Total body length[2]	142.9 cm (56.25 in.)
Neck girth[3]	55.9 cm (22 in.)
Chest girth[4]	91.4 cm (36 in.)
Shoulder height[5]	74.9 cm (29.5 in.)
Shank length[6]	39.4 cm (15.5 in.)
Foot measurements[7]	
Front pad width	11.4 cm (4.5 in.)
Front pad length	5.7 cm (2.25 in.)
Front foot length	11.4 cm (4.5 in.)
Front claw length	5.0 cm (2.0 in.)
Front claw arc	7.0 cm (2.75 in.)
Hind pad width	11.4 cm (4.5 in.)
Hind pad length	15.2 cm (6.0 in.)
Hind foot length	19.7 cm (7.75 in.)
Reproductive state	Lactating
Fat index[9]	3
Ear tags	Yellow plastic rototags
Left	678
Right	679
Lip tattoo	678 Black
Collar color	Yellow

1. Age was determined by the number of cementum annuli rings in extracted tooth.
2. Total body length indicates length from tip of nose to base of tail, following natural body contours.
3. Neck size measured at smallest circumference of neck.
4. Chest girth measurement around the body just posterior to the shoulders.
5. Shoulder height is the distance from heel of front foot to midline between shoulders.
6. Shank length is the distance from the knee to the heel of the hind foot.
7. Foot measurements:
   A. Front pad length
   B. Front pad width
   C. Front foot length
   D. Front claw length



A. Hind pad length
B. Hind pad width
C. Hind foot length



8. Front claw outside arc is measured from base of claw to tip over contour.
9. Fat index is an arbitrary measure of the bear's condition on a scale of 1 to 5; 1 being emaciated, 3 being average, and 5 being extremely fat.

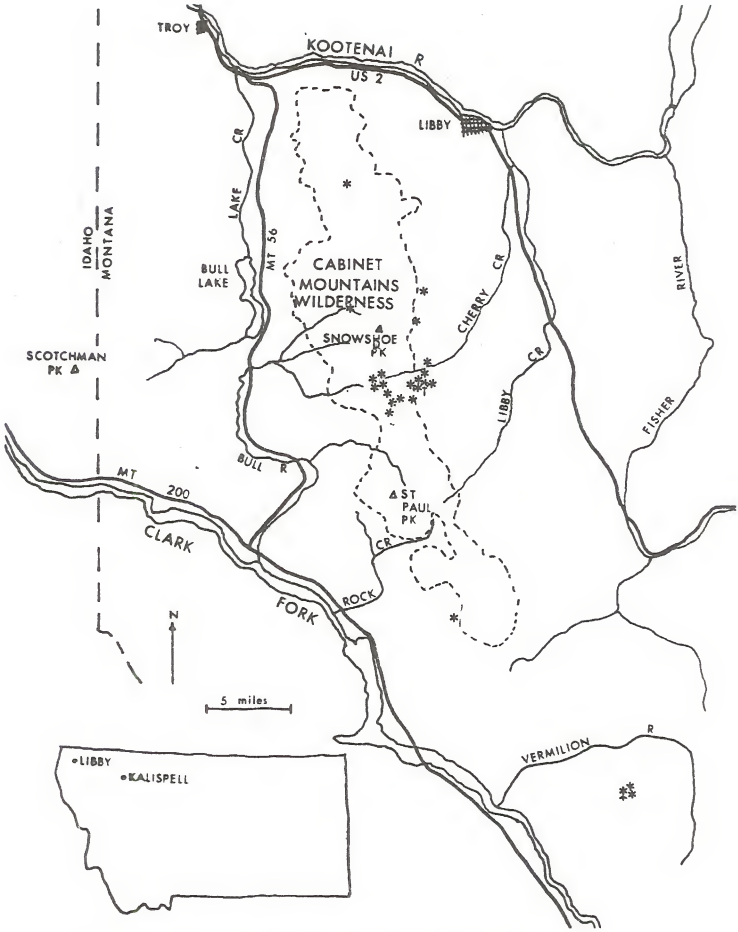


Figure 2. Radio locations of grizzly 678 during 1983. (radio locations indicated by *)

Grizzly scats collected this year will be stored for analysis next year due to the small number involved. Scats that were possibly from grizzlies were sent to Dr. H.D. Picton at Montana State University for use in a technique being developed to differentiate between black and grizzly bear scats by bile acid analysis.

In mid-April two separate sets of grizzly tracks and hair were located in the Bear creek drainage (S.A. Martin pers. comm.). Measurements of these tracks were compared with track dimensions of grizzly 678 and the unsuccessful capture described earlier. One of these tracks was sufficiently larger to distinguish it as a different individual. Another grizzly track measurement from the East Fork of the Bull River in late June (S.A. Martin pers. Comm.) was not sufficiently different from the unsuccessful capture during trapping. A possible observation of a grizzly with cubs was made during mid-September on the west face of Lost Horse Mtn. (A.W. Erickson pers. comm.). The observer was flying a helicopter survey at the time, but could not get close enough to verify the sighting because of poor weather.

BLACK BEAR STUDY

Forty individual black bears were captured during 1983 (Table 2). Of the total, 29 (73%) were males and 11 (27%) were females. The sex ratio of this sample differs significantly from a 50:50 ratio (X^2=8.1, p greater than .005). Age structure information from extracted teeth was not available at the writing of this report. Twelve of the males captured had estimated weights of 91 kg (200 lbs.) or greater. Two males had scale weights of 114 kg (250 lbs.) or greater. Pelage coloration of this sample showed a slight preponderance of black (58%) over brown (42%). Four males and one female were radio-collared. One of the males was radio-collared on the west side of the main Cabinets, while the others were from the east side.

Few radio locations were obtained on black bears during spring and summer due to continued attempts to trap and locate additional grizzlies and the lack of aircraft for radio location flights. During the fall, a pilot and aircraft were contracted and regular locations were obtained.

On the basis of radio locations, bears trapped on either side of the main Cabinets tended to remain on that side and not cross the main divide. Home ranges have not been calculated yet and would be partial at best. The female appeared to have the smallest home range.

Major habitat components used by radio-collared black bears during summer include: open timber, closed timber, alder shrubfield - drainage forbfield complexes, and mixed shrubfield cutting units. Average elevation of radio locations during summer was 1390 m (4561 ft., SD=199 m, N-15).

Table 2. Capture dates, sex, age, ear tag, weight, location, and color of black bears captured in the Cabinet Mtns. during 1983.

Capture Date	Sex	Age[1]	Ear Tag[2] Color	Ear Tag[2] Number	Weight[3]	Location	Hide Color
5/6/83	F	Ad	Red	84-85	130 (a)	W. Fisher	Brown
5/7/83	M	Ad	Red	86-87	235 (e)	W. Fisher	Brown
5/11/83	M	Ad	Red	88-89	185 (a)	Ramsey Cr.	Brown
5/13/83	M	Ad	Red	90-91	290 (a)	Deep Cr.	Black
5/15/83	F	Ad	Red	92-93	120 (a)	Bramlet Cr.	Black
5/15/83	M	Ad	Red	94-95	238 (e)	W. Fisher	Brown
5/16/83	M	Sa	Red	96-97	90 (a)	Ramsey Cr.	Black
5/16/83	M	Ad	Red	98-351	212 (e)	Deep Cr.	Black
5/18/83	F	Sa	Red	352-353	105 (a)	W. Fisher	Brown
5/19/83	F	Sa	Red	354-355	70 (a)	Bramlet Cr.	Black
5/19/83	F	Ad	Red	356-357	120 (a)	W. Fisher	Black
5/20/83	M	Ad	Red	358-359	175 (a)	Bear Cr.	Brown
5/21/83	M	Sa	Red	360-361	130 (a)	Snowshoe Cr.	Black
5/23/83	M	Ad	Red	261-262	219 (e)	Snowshoe Cr.	Black
5/23/83	M	Ad	Red	263-264	250 (a)	Bear Cr.	Brown
5/25/83	F	Sa	Red	363-363	90 (a)	Bull R.	Brown
5/28/83	M	Ad	Red	364-365	145 (a)	Bull R.	Brown
5/29/83	M	Ad	Red	366-367	227 (e)	Snake Cr.	Black
5/29/83	M	Sa	Red	368-369	88 (e)	S.Fk. Bull R.	Black
5/29/83	M	Sa	Red	370-371	120 (e)	Bull R.	Brown
6/2/83	M	Ad	Red	265-266	211 (e)	Bear Cr.	Brown
6/2/83	F	Sa	Red	372-373	110 (a)	S.Fk. Bull R.	Brown
6/3/83	M	Sa	Red	374-375	125 (a)	S.Fk. Bull R.	Black
6/4/83	F	Sa	Red	272-273	85 (a)	E.Fk. Bull R.	Brown
6/4/83	M	Sa	Red	267-268	115 (a)	Libby Cr.	Black
6/5/83	M	Ad	Red	269-270	195 (e)	Cable Cr.	Brown
6/7/83	M	Ad	Red	274-275	147 (e)	Standard Cr.	Black
6/10/83	M	Sa	Red	14-15	130 (a)	W. Fisher	Black
6/15/83	M	Ad	Red	257-258	220 (a)	Libby Cr.	Black
6/16/83	M	Sa	Red	259-260	133 (e)	W. Fisher	Black
6/17/83	M	Ad	Red	253-254	227 (e)	Libby Cr.	Black
6/17/83	F	Ad	Red	255-256	109 (e)	Libby Cr.	Brown
6/21/83	M	Ad	Red	651-652	221 (e)	Bear Cr.	Black
6/23/83	M	Yg	Red	653-654	30 (e)	Libby Cr.	Brown
				663-664	(tag mix-up)		
6/23/83	M	Sa	Red	655-656	120 (a)	Bear Cr.	Black
6/24/83	M	Ad	Red	657-658	200 (e)	Bear Cr.	Black
6/27/83	M	Sa	Red	659-660	77 (e)	Libby Cr.	Black
6/29/83	F	Sa	Red	661-662	51 (e)	Ramsey Cr.	Black
7/4/83	F	Sa	Red	665-666	64 (e)	Ramsey Cr.	Black
7/4/83	M	Ad	Red	667-668	173 (e)	Ramsey Cr.	Brown

1 Ad - Adult Sa - Subadult Yg - Yearling

2 All ear tags were plastic rototags

3 a - actual
e - estimate from regression based on chest girth.

Major habitat components used by radio-collared black bears during fall include: closed timber, open timber, timbered shrubfields, and beargrass sidehill parks. Average elevation of radio locations during fall was 1509 m (4950 ft., SD=272 m, N=56).

Radio-collared black bears showed signs of denning activity during early October. By mid-October, three of five radio-collared bears had denned and by the end of October all five were denned. Elevation of black bear dens was quite variable ranging from 1317 m (4320 ft.) to 1905 m (6520 ft.). Aspect, slope, and habitat component were also variable. Black bear scats were collected and frozen for analysis next year.

DISCUSSION

The grizzly captured during 1983 appears to be one of the oldest free-ranging grizzlies aged in the lower 48 states. No other reports of older individuals could be found. Despite the fact that no cubs or yearlings were observed with grizzly 678 following capture, she must have at least conceived young in order to go through the physiological processes necessary to produce the lactation noted at capture. Jonkel (1978) noted that bears may lactate for 18-20 months. It is possible that grizzly 678 produced cubs that died prior to capture or had yearlings that were cast off or died. Track measurements indicate that there are at least two other grizzlies using the same portion of the main Cabinets as grizzly 678.

Insufficient data was available from summer to make comparisons between black and grizzly bear habitat-use, but fall data may show some trends. Locations indicated heavier use of shrub types and less use of closed timber by grizzly 678 when compared to radio-collared black bears. Use of elevation, slope and aspect showed little divergent trend.

Radio locations did indicate a possible difference in time of denning. Four of five radio collared black bears were denned by the 3rd week of October and all five were denned by late October. The female grizzly did not den till the 2nd or 3rd week of November.

PROBLEMS ENCOUNTERED AND PLANS

The lack of a local pilot and aircraft posed problems for this study during the summer months. Ground attempts to locate the grizzly in the back country areas proved unproductive. Trapping activities also decreased time available for monitoring from the ground. A service contract with a pilot from Thompson Falls was obtained in late September. Thereafter flights were made twice weekly or as weather permitted. Increased funding will be necessary to continue this rate of relocation, especially with additional

radio-collars on black and grizzly bears anticipated next year. It may also prove beneficial to increase trapping effort by placing a second trap team in the field from mid-April through mid-July. Vehicle and personnel costs of this effort will also require additional funding. A study plan and budget has been drafted and shall be presented to potential funding agencies and industry representatives this winter.

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